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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,792	09/21/2006	Arndt Jaeger	12406-213US1 P2004,0273 U	2788
26161 7590 09/20/2011 FISH & RICHARDSON P.C. (BO) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER PATTON, PAUL E	
			ART UNIT 2822	PAPER NUMBER
			NOTIFICATION DATE 09/20/2011	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No. 10/593,792	Applicant(s) JAEGER ET AL.
	Examiner PAUL PATTON	Art Unit 2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-15 and 21-40 is/are rejected.
- 7) ☒ Claim(s) 16-20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/18/2011</u> . | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) <input type="checkbox"/> Notice of Informal Patent Application
6) <input type="checkbox"/> Other: _____. |
|---|--|

DETAILED ACTION

Response to Amendment

1. Applicant's arguments with respect to claims 1 and 9 have been considered but are moot in view of the new ground(s) of rejection.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4 - 10, 13 - 15, 21,22, 24 - 27, 29, 32 – 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Augusto (US 2002/0101895 A1) in view of Augusto (USPAT 7,521,737 B2) hereinafter Augusto B.

4. As to claim 1, Augusto discloses a radiation detector that detects radiation according to a predefined spectral sensitivity distribution that exhibits a maximum at a predefined wavelength)% the radiation detector comprising a semiconductor body with an active region serving to generate a detector signal and intended to receive radiation, wherein said active region comprises a plurality of functional layers, at least two of said functional layers having different band gaps, each one of the functional layers being implemented to absorb at least some of the radiation; wherein at least a part of said functional layers absorbs radiation in a wavelength range that includes wavelengths greater than the wavelength λ_0 . (Paragraphs [0175]-[0191]. Note that while Augusto uses different terminology, he discloses a multilayered detector that uses at least

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two different layers having differing band gaps absorbing a different portion of the spectrum.

5. Augusto does not disclose that the semiconductor body corresponds to a PIN diode structure.

6. Augusto B is related to a similar radiation detector and discloses that the detector semiconductor body corresponds to a PIN diode structure. (Column 7, lines 1-9).

7. Augusto B is evidence that a person of ordinary skill in the art would find a reason, suggestion or motivation to use a PIN diode structure.

8. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Augusto by using a PIN diode structure for advantages such as integrating PIN devices with CMOS on a common substrate according to the teachings of Augusto B. (Column 3, line 66 – column 4, line 9).

9. As to claim 2 Augusto as modified by Augusto B discloses the spectral sensitivity distribution of the human eye. Where Augusto states that the detector responds to the visible spectrum. (Paragraph [0176].

10. As to claim 4, Augusto as modified by Augusto B discloses disposed after said active region is a filter layer structure comprising at least one filter layer, which filter layer structure determines the short-wave side of the detector sensitivity in accordance with the predefined spectral sensitivity distribution by absorbing radiation in a wavelength range that includes wavelengths smaller than λ_0 . (Paragraphs [0177-0179]).

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11. As to claim 9, Augusto as modified by Augusto B discloses a radiation detector that detects radiation in accordance with a predefined spectral sensitivity distribution that exhibits a maximum at a predefined wavelength λ_0 , said radiation detector comprising a semiconductor body with an active region serving to generate detector signals and intended to receive radiation, wherein said active region comprises a plurality of functional layers, at least two of said functional layers having different band gaps and each of the functional layers is implemented to absorb at least some of the radiation; wherein disposed after said active region is a filter layer structure comprising at least one filter layer, which filter layer structure forms a portion of the semiconductor body and determines the short-wave side of said detector sensitivity in accordance with said predefined spectral sensitivity distribution by absorbing radiation in a wavelength range that includes wavelengths smaller than λ_0 , and wherein the semiconductor body corresponds to a PIN diode structure. (Augusto, paragraphs [0175]-[0191] and Augusto B, column 7, lines 1-9 and column 12, lines 11-25).

12. As to claim 10, Augusto as modified by Augusto B discloses the spectral sensitivity distribution is that of the human eye, Where Augusto states that the detector responds to the visible spectrum. (Augusto, paragraph [0176].

13. As to claim 13, Augusto as modified by Augusto B discloses functional layers at least partially absorb radiation is a wavelength range that includes wavelengths greater than the wavelength λ_0 . Since Augusto discloses that the detector covers the visible spectrum and since applicant defines λ_0 as the nominal center of the visible spectrum the range is covered.

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14. As to claim 14, Augusto as modified by Augusto B discloses the functional layers have different thickness. (Augusto, paragraph [0187]).

15. As to claim 15, Augusto as modified by Augusto B discloses the filter layer structure is disposed after said active region in the direction of the incident radiation. (Augusto, paragraphs [0196-207]).

16. As to claim 21, Augusto as modified by Augusto B discloses the filter layer structure comprises a plurality of filter layer of different band gaps and/or thickness. (Augusto, paragraphs [0196-207]).

17. As to claim 22, Augusto as modified by Augusto B discloses the filter layer structure determines the short-wave side of said detector sensitivity by absorbing radiation via a direct band gap of the respective filter layer in a wavelength range that includes wavelengths smaller than λ_0 . (Augusto, paragraphs [0194-0195]).

18. As to claim 24, Augusto as modified by Augusto B discloses the functional layers determine by their implementation the long-wave side of said detector sensitivity in accordance with said predefined spectral sensitivity distribution for wavelengths greater than λ_0 . (Paragraph [0194-0195]).

19. As to claim 25, Augusto as modified by Augusto B discloses the respective band gaps of functional layers disposed one after the other in said semiconductor body at least partially increase in the direction of the incident radiation. (Augusto, paragraph [0192]).

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20. As to claim 26, Augusto as modified by Augusto B discloses the functional layers or at least a portion of said functional layers are substantially undoped. (Augusto, paragraphs [0079 - 0080]).

21. As to claim 27, Augusto as modified by Augusto B discloses the active region comprises at least one heterostructure. (Augusto, paragraphs [0196-0207]).

22. As to claim 29, Augusto as modified by Augusto B discloses the semiconductor body particularly the semiconductor body comprising said filter layer structure in monolithically integrated. (Augusto, paragraph [0085]).

23. As to claims 32 and 34 Augusto as modified by Augusto B discloses the active region corresponds to a continuous, intrinsic region of the semiconductor body. (Augusto, paragraph [0085]).

24. As to claims 35 and 37 Augusto as modified by Augusto B discloses the functional layers are epitaxial layers that form a monolithically integrated active region. (Augusto, paragraph [0085]).

25. As to claims 38 and 40 Augusto as modified by Augusto B discloses functional layers are consecutive layer in a layer stack, and wherein each functional layer is in direct contact with adjacent functional layer in the layer stack. (Augusto, paragraphs [0196-0207]).

26. Claims 3, 5-8, 23, 28, 30, 31,33, 36, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Augusto in view of Augusto B and further in view of Major et al., (USPAT 5,689,123) hereinafter Major.

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27. As to claims 3 and 11, Augusto as modified by Augusto B discloses various material systems for forming the active layers but indicates a preference for a Silicon compatible system and thus does not expressly disclose the semiconductor body contains at least on III/V semiconductor material.

28. Major is related to a similar optoelectronic device and discloses at least one III/V semiconductor material. (Column 3, lines 50-58).

29. Major is evidence that a person of ordinary skill in the art would find a reason, suggestion or motivation to use at least one III/V semiconductor material.

30. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Augusto and Augusto B by using at least one III/V semiconductor material for advantages such as growth of a cubic crystal lattice according to the teachings of Major. (Column 3, lines 42-48).

31. As to claim 5, Augusto as modified by Augusto B and Major discloses a radiation detector for detecting radiation in accordance with the predefined spectral sensitivity distribution of the human eye, which exhibits a maximum at the wavelength λ_0 , the radiation detector comprising a semiconductor body with an active region serving to generate a detector signal and intended to receive radiation, wherein said semiconductor body comprises at least one III/V semiconductor material and said active region comprises a plurality of functional layers; wherein each one of said functional layers is configured to absorb at least some of the radiation and the semiconductor body corresponds to a PIN diode structure. (Augusto, Paragraphs [0175]-[0191], Augusto B, column 7, lines 1-9, and Major, column 3, lines 50-58).

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32. As to claim 6, Augusto as modified by Augusto B and Major discloses functional layers at least partially absorb radiation is a wavelength range that includes wavelengths greater than the wavelength λ_0 . Since Augusto discloses that the detector covers the visible spectrum and since applicant defines λ_0 as the nominal center of the visible spectrum the range is covered.

33. As to claim 7, Augusto as modified by Augusto B and Major discloses the functional layers have different thickness. (Augusto, paragraph [0187]).

34. As to claim 8, Augusto as modified by Augusto B and Major discloses the filter layer structure determines the short-wave side of said detector sensitivity by absorbing radiation via a direct band gap of the respective filter layer in a wavelength range that includes wavelengths smaller than λ_0 . (Augusto, paragraphs [0194-0195]).

35. As to claim 28, Augusto as modified by Augusto B and Major discloses the active region, particularly the functional layers contains at least on III/V semiconductor material. (Major .Column 3, lines 50-58).

36. As to claims 30 and 31, Augusto as modified by Augusto B and Major discloses the at least one III/V semiconductor material comprises a material having a composition $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{P}$, $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{As}$, or $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{N}$, wherein in each case $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x + y \leq 1$. (Major, column 9, lines 14-51).

37. As to claim 33, Augusto as modified by Augusto B and Major discloses the active region corresponds to a continuous, intrinsic region of the semiconductor body.
(Augusto, paragraph [0085])

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38. As to claim 36, Augusto as modified by Augusto B and Major discloses the functional layers are epitaxial layers that form a monolithically integrated active region. (Augusto, paragraph [0085])

39. As to claim 39, Augusto as modified by Augusto B and Major discloses functional layers are consecutive layer in a layer stack, and wherein each functional layer is in direct contact with adjacent functional layer in the layer stack. (Augusto, paragraphs [0196-0207]).

40. As to claim 23, Augusto as modified by Augusto B and Major discloses the claimed invention except for the filter layer having a thickness of 1 um or less. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to adjust the filter layer thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Bosch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

41. Claims 16-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

42. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record, taken alone or in combination fails to anticipate or render obvious a filter layer structure comprises a single filter layer having a direct band gap and an indirect band gap as recited in claim 16.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL PATTON whose telephone number is (571)272-9762. The examiner can normally be reached on 7:00 - 5:30 Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul E Patton
Examiner
Art Unit 2822

/P. E. P./
Examiner, Art Unit 2822

/Zandra V. Smith/

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Supervisory Patent Examiner, Art Unit 2822